

Test and Evaluation Support Tool and Example Repository (TESTER)

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The last several years have brought about changes regarding how test and evaluation will be done, moving the focus from the individual system level up to mission impacts and the value added to current capabilities. As a result, the Army Evaluation Center is making changes to include the implementation of a mission-based test and evaluation methodology that focuses on a system's contribution to the overall mission. This new methodology has been documented and is currently being executed but has proven to be rather cumbersome and difficult to implement. To overcome the challenges and move evaluators from Word documents and Excel sheets into the technology age of user forms and online accessibility, we have developed a system concept called the Test and Evaluation Support Tool and Example Repository (TESTER).

Key words: Cross Command Collaboration Effort (3CE), Mission-Based Test and Evaluation (MBT&E), Test & Evaluation Support Tool and Example Repository (TESTER).

In the Army Evaluation Center (AEC), a subordinate command of U.S. Army Test and Evaluation Command (ATEC), the mission is to provide independent evaluation of systems through the use of Test and Evaluation (T&E) to provide decision makers with information on system performance and the ability of the system to meet customer needs. It only makes sense then, that AEC should use systems engineering, the processes beginning with the identification of customer needs and continues throughout the acquisition life cycle in every facet of daily business.

In reality, however, evaluations often play a game of catch-up and start later in the system development life cycle than ideal. The result includes minimal evaluation and understanding of how a system will affect higher-level missions and limited ability to show improved functionality and value of deployed units with the additional systems. Current limitations of testing and evaluating systems resulted in policy changes for T&E recorded in the Department of Defense Instruction 5000.02 dated December 8, 2008 (DoD, 2008). Changes included using T&E to “assess improvements to mission capability... based on user needs and should be reported in terms of operational significance to the user” and requiring evaluations to “include a comparison with current mission capabilities.”

Evaluation transformation

To meet the changes laid out in the DoDI 5000.02, AEC has begun implementing some changes in how T&E is approached and executed. One of the key changes has been the implementation of a Mission-Based Test and Evaluation (MBT&E) process, which takes the evaluator through a step-by-step process, ensuring the system is evaluated based on its contribution to the mission as a whole and value added to current capabilities. An article addressing these policy changes and the MBT&E initiative was published in the September 2009 *ITEA Journal*, which provides an outline of the process and purpose of MBT&E (Apicella, 2009).

MBT&E is still in its infancy for use within AEC, having just been initiated in January 2009 and, as a result, lessons are currently being learned and recorded to improve the process. One of the key lessons that has been captured thus far is the realization that the process is rather cumbersome and the spreadsheet designed to capture evaluation measures and data can become overwhelming in size. To try and overcome these challenges and bring evaluations into the new technology age, we are developing a new system named the Test & Evaluation Support Tool and Example Repository (TESTER). The TESTER system will be a Web-based program offering many benefits to evaluations including:

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- provide an online electronic system for evaluators and system stakeholders to work collaboratively on system evaluations;
- guide users through the MBT&E steps using interactive interfaces (such as drop-down menus) to facilitate an easier-to-use process;
- develop standardized formats for evaluation products while still allowing content flexibility to meet varying system evaluation needs;
- link Cross Command Collaboration Effort (3CE) products into system evaluations;
- ensure standardized system names and schedules by direct connections with the ATEC decision support system; and
- facilitate storage of documents on a digital library enabling a common document repository.

The TESTER concept

As trial mission-based evaluations were being executed, an MBT&E working group was formed to assess the

needs of evaluators using this new methodology. It was determined that an online system would provide needed assistance to users to facilitate the new evaluation process. While existing systems could be used to support various aspects of MBT&E, some new development would still need to occur to meet the implementation methods outlined by the MBT&E process and guide. Based on this, the TESTER concept was designed to use existing programming and build new interfaces following the MBT&E implementation guide. The concept was further refined with lessons learned from AEC evaluators using MBT&E in their evaluations and future needs of large system-of-system programs like the U.S. Army Brigade Combat Team Modernization program.

MBT&E interface

TESTER will consist of three main components: MBT&E user forms, 3CE metric catalog, and an example repository. The first component, MBT&E user forms, will walk the user through each step in the MBT&E process beginning with the collection of information. This first step will be a collaborative effort

between TESTER and the digital library. The digital library will facilitate the storage of documents according to their existing file structure organized by system. ATEC system team members and other stakeholders will be provided links and guided to information used for the system evaluation, all maintained on one common site. The user is then led through steps to capture which missions the system will address and which tasks will be performed. Throughout the MBT&E process, users will be steered toward an evaluation that considers the wider scope of how the system will add value to current capabilities and increase the potential for a unit to accomplish its mission.

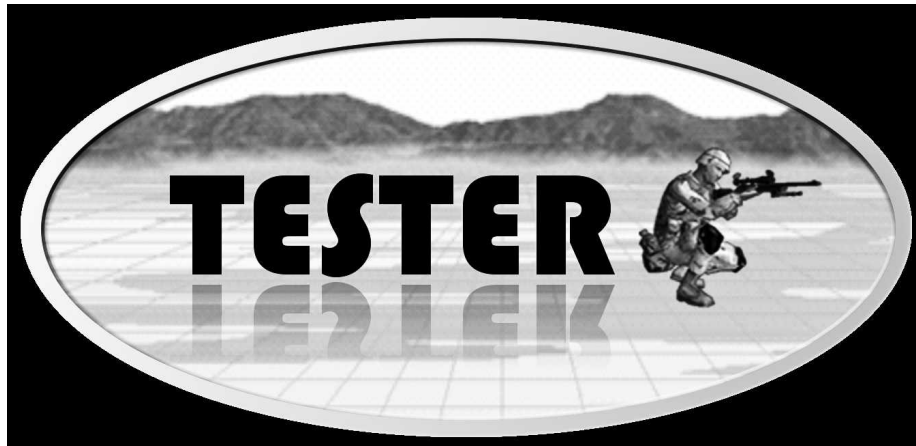
During these steps, TESTER will provide time-saving features like drop-down menus for standardized information and the selection of information previously

entered into the system. Other features will include one-click selections to link information between steps, auto-numbering when entering information, the ability to rearrange the

order of information, and autocorrecting of numbering when rearranging the order of information. These features will help reduce duplicative entry of information and provide a vast improvement from current methods being used, including Microsoft Word and Excel. Additionally the user interface will be intuitive, allowing users to interface with the system without the need for specialized training. Finally TESTER will produce standardized documents for evaluations and, using links to the digital library, allow for easy storage of finalized evaluation products.

3CE metric catalog

The second component of TESTER is the 3CE effort metric catalog. 3CE was initiated in 2004 following the 2003 Army Modeling and Simulation Executive Council meeting, where a memorandum of understanding was signed between the Training and Doctrine Command, ATEC, and Research, Development and Engineering Command to work toward distributed Modeling and Simulation (M&S). 3CE has a mission to develop a cross command Army M&S



and data environment for design, development, integration, and testing of capabilities, systems, and prototypes. To accomplish this, 3CE has been obtaining requirements from the three commands, program managers, and other stakeholders (like the lead system integrator) since 2004 and building a database of requirements. The database has been further enhanced by decomposing the requirements for data elements, which are the data and information that will need to be collected from a test or M&S to answer the requirement. This information is used in the development of system engineering architecture that shows the M&S environment and data requirements. Additional efforts are currently underway to compare the requirements to current M&S tools to identify gaps and possible solutions to meet requirement needs.

Currently, 3CE products reside on the knowledge repository located on the Army Knowledge Online system; however, there is no ability to view and search the database of requirements online. TESTER will provide online access to the 3CE database, called the metrics catalog, which includes all requirements collected by 3CE, data elements, calculations to answer requirements, and potential data sources. 3CE is also developing Department of Defense architecture framework views, which support one of the final steps in the MBT&E process. The information and products being developed by 3CE will also be linked into the MBT&E user forms component, providing users with a wealth of information to draw from while developing their system evaluations.

Example repository

The final component of TESTER will provide users with examples of historical reference material such as system evaluation plans, verification, validation, and accreditation documents, and model informational reports. These materials will be searchable and exportable for ease of use and provide users with references for future projects. The example repository will also provide additional references for MBT&E products and the use and implementation of 3CE products.

The future outlook

The need for TESTER to facilitate MBT&E processes is a current and pressing issue, so work has been swiftly executed to develop a technical capabilities requirement document. Concurrently meetings have been held with collaborative systems proponents and with individuals who have participated in the trial MBT&E evaluations and assessments. Information and experiences have been gathered to ensure user needs are met and that TESTER will provide an essential tool to facilitate system evaluation. TESTER is expected to be fully developed and utilized by the spring of 2011 with efforts underway to reduce the development time to meet pressing needs. □

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